




# Public Works and Government Services Canada

Requisition No: EZ899-151543/A

DRAWINGS & SPECIFICATIONS  
for  
Gwaii Haanas National Park  
Ellen Island and Huxley Island  
Fuel System Upgrades

Project No. R.068241.001  
October 2014

**APPROVED BY:**


  
\_\_\_\_\_  
Regional Manager, AES

Nov. 17 / 2014  
Date

  
\_\_\_\_\_  
Construction Safety Coordinator

2014-11-17  
Date

**TENDER:**

  
\_\_\_\_\_  
Project Manager

17 / 11 / 20  
Date

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**Public Works and  
Government Services Canada**

**Parks Canada  
Gwaii Haanas National Park**

**Huxley Island  
and  
Ellen Island**

**Fuel System Upgrades**

**Specifications**

**PWGSC R.068241.001**

**November 6, 2014**

**WSP Project No. 121-19597-08**

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**List of Drawings**

<b>Drawing No.</b>	<b>Title</b>
G001	Cover Sheet
M101	Ellen Island Site Plan Existing Fuel System Demolition
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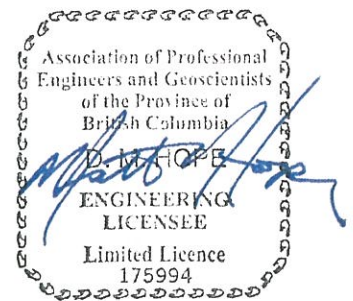
Donald Matthew Hope is authorized by the Association of PROFESSIONAL ENGINEERS AND GEOSCIENTISTS of the Province of British Columbia to engage in the practice of Professional Engineering within the limited scope as specified hereunder

Limited to

- 1 Petroleum Storage Systems with ULC Standard shop fabricated tanks,
- 2 Petroleum Transfer Systems to auxiliary tanks and fuel burning appliances,
- 3 Petroleum Dispensing Facilities and product transfer areas with aboveground and underground piping and leak detection,
- 4 Water Distribution Systems up to 10,000 people (planning and evaluating),
- 5 Water Distribution Piping,
- 6 Process Piping for pump stations and water treatment plants,
- 7 Sanitary Sewer Collection Systems,
- 8 Storm Water Collection Systems,
- 9 Work that is in conformance with commonly published and recognized standards.

Exclusions

- a Design of field erected storage tanks, refining process equipment and bulk distribution facilities
- b Design of water and wastewater treatment plants and pump stations



NOV 06 2014

**PART 1 GENERAL**

**1.1 DESCRIPTION OF WORK**

- .1 Work under this Contract covers the construction of upgrades to the existing fuel systems in Gwaii Haanas National Park. Parks Canada operates two remote gasoline storage and dispensing systems one at Huxley Island and one at Ellen Island. Both of these sites are remote islands with no roads and access by boat only.
- .2 For the purpose of this Contract:
  - .1 Parks Canada shall be considered the Owner.
  - .2 Contractor shall be the Prime Contractor.
  - .3 WSP shall be the Departmental Representative.
- .3 The work shall include the supply of labour, materials, and equipment to install new gasoline storage tanks and piping at the existing sites. It will be the contractor's responsibility to ensure all of the works shown on the drawings and specifications are complete in every respect. The following generally describes the work to be done and materials to be supplied.
- .4 Demolition, Salvage and Re-Used Equipment
  - .1 All tanks, piping and equipment which become redundant and are no longer required due to the work shall become the property of the Contractor and shall be completely removed from the site. All disposal to conform with applicable regulations and as stated in the specifications.
  - .2 The items indicated as 'SALVAGE' shall be carefully removed to avoid damaging them and shall remain the property of the Owner. Provide a temporary protected location on site and move the items to that location. Coordinate with the Owner and move the salvaged items to the Owner's storage area. Obtain a written receipt from the Owner for each item.
  - .3 Where existing equipment is being relocated and re-used, check and report on the condition before removal to the Consultant. Any damage by the work of this contract is the responsibility of the Contractor.
- .5 Remove the following:
  - .1 Two 2500L double wall, steel, above ground storage tanks, piping and ancillary equipment.
  - .2 Two 2250L double wall, steel, above ground storage tanks, piping and ancillary equipment.
  - .3 Petroleum sludge.
  - .4 All existing timber cribbing and tank supports.
- .6 Salvage the following:
  - .1 Two Fuel Pump Cabinets.
  - .2 Four Fuel Pumps with filters and meters.
- .7 Supply and installation of the following:
  - .1 Concrete tank slabs.
  - .2 Install four owner supplied 2200L, double wall, steel, ULC-S601, tank.
  - .3 All associated valves, piping, pipe supports and fittings for the new tanks and dispensing system.
  - .4 Supply and install all electrical components for the system.
- .8 The Contractor is responsible to supply and install all components to construct a complete working system as indicated on the contract drawings and the specifications.
- .9 The Contractor is responsible for commissioning the new fuel systems to prove operation in conformance with the design intent.

- .10 All work shall be completed within 6 weeks of the contract award.
- .11 If significant historical or archaeological artifacts, or human remains are discovered, stop work, report it immediately to the Departmental Representative Tom Dunphy at (604) 775 6659, and the Park Office at (250) 559 6303 and Camille Collinson at (250) 559 6320 and Marvin Pearson (250) 559 6321. If there is no answer, call Jasper Dispatch at 1-877-852-3100 and wait for instructions before proceeding with work. If this is encountered, the park will take a GPS location and photos of the remains and will contact the park archeologist Bill Perry at (403) 221 7989 for further guidance.

**1.3 GREEN REQUIREMENTS:**

- .1 Use only environmentally responsible green materials/products with no VOC emissions or minimum VOC emissions of indoor off-gassing contaminants for improved indoor air quality – subject of Departmental Representative’s approval of submitted MSDS Product Data.
- .2 Use materials/products containing highest percentage of recycled and recovered materials practicable – consistent with maintaining cost effective satisfactory levels of competition.
- .3 Adhere to waste reduction requirement for reuse or recycling of waste materials, thus diverting materials from landfill.

**1.4 CONTRACT DOCUMENTS**

- .1 The Contract documents, drawings and specifications are intended to complement each other, and to provide for and include everything necessary for the completion of the work.
- .2 Drawings are, in general, diagrammatic and are intended to indicate the scope and general arrangement of the work.

**1.5 WORK SCHEDULE**

- .1 Carry on work as per indicated “PHASES” and as follows:
  - .1 Within 10 working days after Contract award, provide a “phasing bar chart” and a schedule showing anticipated progress stages and final completion of the work within the time period required by the Contract documents. Indicate the following:
    - .1 Submission of shop drawings, product data, MSDS sheets and samples.
    - .2 Commencement and completion of work of each section of the specifications or trade for each phase as outlined.
    - .3 Final completion date within the time period required by the Contract documents.
  - .2 Do not change approved Schedule – without notifying Departmental Representative.
  - .3 Interim reviews of work progress based on work schedule will be conducted as decided by Departmental Representative and schedule updated by Contractor in conjunction with and to approval of Departmental Representative.

**1.6 COST BREAKDOWN**

- .1 Before submitting the first progress claim, submit a breakdown of the Contract lump sum prices in detail as directed by the Departmental Representative and aggregating Contract price.

- .4 Copy of approved work schedule.
- .5 Reviewed/approved shop drawings.
- .6 Change orders.
- .7 Other modifications to Contract.
- .8 Field test reports.
- .9 Reviewed/approved samples.
- .10 Manufacturers' installation and application instructions.
- .11 One set of record drawings and specifications for "as-built" purposes.
- .12 Current construction standards of workmanship listed in technical Sections.

#### **1.7 REGULATORY REQUIREMENTS**

- .1 Obtain and pay for – Building Permit, Certificates, Licenses and other permit required by regulatory municipal, provincial or federal authorities to complete the work.
- .2 Provide inspection authorities with plans and information required for issue of acceptance certificates.
- .3 Furnish inspection certificates in evidence that the work installed conforms with the requirements of the authority having jurisdiction.

#### **1.8 CONTRACTOR'S USE OF SITE**

- .1 Use of site:
  - .1 Exclusive and complete for execution of work.
  - .2 Assume responsibility for assigned premises for performance of this work.
  - .3 Be responsible for coordination of all work activities on site, including the work of other contractors engaged by the Departmental Representative such as moving contractors and furniture installers.
- .2 Perform work in accordance with Contract documents. Ensure work is carried out in accordance with indicated phasing.
- .3 Do not unreasonably encumber site with material or equipment.
- .4 Use only indicated [elevators] for moving workers and material.
  - .1 Protect walls of passenger elevators, to approval of Departmental Representative prior to use.
  - .2 Accept liability for damage, safety of equipment and overloading of existing equipment.

#### **1.9 CODES**

- .1 Perform Work in accordance with the most current edition of the:
  - .1 National Building Code.
  - .2 National Fire Code.
  - .3 National Electrical Code.
  - .4 Installation Code for Oil Burning Equipment CAN/CSA-B139-09.
  - .5 Canadian Environmental Protection Act
  - .6 Canadian Labour Code Part II, WorkSafe BC, Occupational Health and Safety and any other code of provincial or local application provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.
- .2 All work shall be performed in strict accordance with the drawings and specifications. If any conflicts exist, the drawings will prevail and the Departmental Representative shall be contacted immediately.
- .3 Contractor shall obtain all required permits and be solely responsible for construction means, methods, techniques, sequences and procedures and for coordinating the various parts of the work.
- .4 During the construction period the Contractor shall be responsible for the safety of the designated construction areas. The Contractor shall provide adequate shoring, bracing,

and guys in accordance with all Federal, Provincial, and Municipal Safety Regulations, as well as all requirements of the Occupational Health and Safety Regulations of British Columbia.

**1.10 PROJECT MEETINGS**

- .1 The Departmental Representative will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.

**1.11 LOCATION OF EQUIPMENT AND FIXTURES**

- .1 All information shown on the drawings relative to existing conditions is given as the best present knowledge, but without guarantee of accuracy. Where actual conditions conflict with the drawings they shall be reported to the Departmental Representative so that the proper revisions may be made. Modifications of details of construction shall not be made without written approval of the Departmental Representative. Where information on contract drawings conflicts with information given in this specification, the drawing information will prevail.
- .2 Location of equipment, fixtures, and outlets indicated or specified are to be considered as approximate. All suspended mechanical equipment to be sway or laterally braced.

**1.12 QUALITY OF WORK**

- .1 Ensure that quality workmanship is performed through use of skilled tradesmen, under supervision of qualified journeyman.
- .2 The workmanship, erection methods and procedures to meet minimum standards set out in the National Building Code of Canada, National Fire Code of Canada and General Construction Standards.
- .3 In cases of dispute, decisions as to standard or quality of work rest solely with the Departmental Representative, whose decision is final.

**1.13 APPROVAL OF SHOP DRAWINGS, PRODUCT DATA AND SAMPLES**

- .1 In accordance with Section 01 33 00, submit the requested shop drawings, product data, MSDS sheets and samples indicated in each of the technical Sections.
- .2 Allow sufficient time for the following:
  - .1 Review of product data.
  - .2 Approval of shop drawings.
  - .3 Review of re-submission.
  - .4 Ordering of approved material and/or products.

**1.14 RELICS AND ANTIQUITIES**

- .1 Relics and antiquities and items of historical or scientific interest shall remain property of Department. Protect such articles and request directives from Departmental Representative.
- .2 Give immediate notice to Departmental Representative if evidence of archeological finds are encountered during excavation/construction, and await Departmental Representative's written instructions before proceeding with work in this area.

**1.15 AS-BUILT DOCUMENTS**

- .1 The Departmental Representative will provide 2 sets of drawings, and 2 sets of specifications for "as-built" purposes.
- .2 As work progresses, maintain accurate records to show all deviations from the Contract documents. Note on as-built specifications, drawings and shop drawings as changes occur.

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**1.16 CLEANING**

- .1 Daily conduct cleaning and disposal operations. Comply with local ordinances and anti-pollution laws.
- .2 Ensure cleanup of the work areas each day after completion of work.
- .3 In preparation for interim and final inspections:
  - .1 Examine all sight-exposed interior and exterior surfaced and concealed spaces.
  - .2 Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior finished surfaces, including glass and other polished surfaces.
- .4 Use cleaning materials and methods in accordance with instructions of the manufacturer of the surface to be cleaned.

**PART 2 PRODUCTS**

**2.1 NOT USED**

**PART 3 EXECUTION**

**3.1 NOT USED**

**END OF SECTION**



**PART 1 GENERAL**

**1.1 APPROVALS**

- .1 Approval of shop drawings and samples: refer to Section 01 00 50, Clause 1.13.

**1.2 GENERAL**

- .1 This Section specifies general requirements and procedures for the Contractor's submissions of shop drawings, product data, samples and other requested submittals to Departmental Representative for review. Additional specific requirements for submissions are specified in individual technical sections.
- .2 Present shop drawings, product data and samples in SI Metric units.
- .3 Where items or information is not produced in SI Metric units, converted values are acceptable.
- .4 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submissions.
- .5 Notify Departmental Representative in writing at time of submission, identifying deviations from requirements of Contract documents and stating reasons for deviations.
- .6 Contractor's responsibility for deviations in submission from requirements of Contract documents is not relieved by Departmental Representative's review of submission unless Departmental Representative gives written acceptance of specific deviations.
- .7 Make any changes in submissions which Departmental Representative may require consistent with Contract documents and resubmit as directed by Departmental Representative.
- .8 Notify Departmental Representative in writing, when resubmitting, of any revisions other than those requested by Departmental Representative.
- .9 Do not proceed with work until relevant submissions are reviewed and approved by the Departmental Representative.

**1.3 SUBMISSION REQUIREMENTS**

- .1 Coordinate each submission with the requirements of the work and the Contract documents. Individual submissions will not be reviewed until all related information is available.
- .2 Allow (5) five work days for Departmental Representative's review of each submission, unless noted otherwise.
- .3 Accompany submissions with transmittal letter, in duplicate, containing:
  - .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, product data and sample.
  - .5 Other pertinent data.
- .4 Submissions shall include:
  - .1 Date and revision dates.
  - .2 Project title and number.

- .3 Name and address of:
  - .1 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative, certifying approval of submissions, verification of field measurements and compliance with Contract documents.
- .5 Details of appropriate portions of work as applicable.
  - .1 Fabrication.
  - .2 Layout, showing dimensions (including identified field dimensions: and clearances.
  - .3 Setting or erection details.
  - .4 Capacities.
  - .5 Performance characteristics.
  - .6 Standards.
  - .7 Operating weight.
  - .8 Wiring diagrams.
  - .9 Single line and schematic diagrams.
  - .10 Relationship to adjacent work.
- .6 After Departmental Representative's review, distribute copies.

#### **1.4 SHOP DRAWINGS**

- .1 Shop drawings: original drawings or modified standard drawings provided by Contractor to illustrate details of portion of work which are specific to project requirements.
- .2 Maximum sheet size: 850 x 1050 mm.
- .3 Submit 6 prints of shop drawings for each requirement requested in the specification sections and/or as requested by the Departmental Representative.
- .4 Cross-reference shop drawing information to applicable portions of the Contract documents.

#### **1.5 SHOP DRAWINGS REVIEW**

- .1 Review of shop drawings by Departmental Representative is for the sole purpose of ascertaining conformance with the general concept.
- .2 This review shall not mean that Departmental Representative approves the detail design inherent in the shop drawings, responsibility for which shall remain with Contractor submitting same.
- .3 This review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the construction and Contract documents.
- .4 Without restricting the generality of the foregoing, the Contractor is responsible for:
  - .1 Dimensions to be confirmed and correlated at the job site.
  - .2 Information that pertains solely to fabrication processes or to techniques of construction and installation.
  - .3 Coordination of the work of all sub-trades.

**1.6 PRODUCT DATA**

- .1 Product data: manufacturers' catalogue sheets, MSDS sheets, brochures, literature, performance charts and diagrams, used to illustrate standard manufactured products or any other specified information.
- .2 Delete information not applicable to project.
- .3 Supplement standard information to provide details applicable to project.
- .4 Cross-reference product data information to applicable portions of Contract documents.
- .5 Submit 6 copies of product data.

**1.7 SAMPLES**

- .1 Samples: examples of materials, equipment, quality, finishes and workmanship.
- .2 Where colour, pattern or texture is a criterion, submit a full range of samples.
- .3 Reviewed and accepted samples will become the standard of workmanship and material against which installed work will be verified.

**1.8 PROGRESS SCHEDULE**

- .1 Submit work schedule and cost breakdown as required in Section 01 00 50.

**PART 2 PRODUCTS**

**2.1 NOT USED**

**PART 3 EXECUTION**

**3.1 NOT USED**

**END OF SECTION**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- .1 Health and safety considerations required to ensure that the Contractor shows due diligence towards health and safety on construction sites, and meets the requirements laid out in PWGSC/RPB Departmental Policy DP 073 - Occupational Health and Safety - Construction.

**1.2 RELATED SECTIONS**

- .1 Section 02 65 00 – Fuel Storage Tank Removal.

**1.3 REFERENCES**

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
  - .1 Material Safety Data Sheets (MSDS).
- .3 Province of British Columbia.
  - .1 Workers Compensation Act, RSBC 1996 - Updated 2006.

**1.4 SUBMITTALS**

- .1 Submit to Departmental Representative a Site Specific Health and Safety Plan prior to commencing work.
- .2 Submit copies of reports or directions issued by Federal, Provincial/Territorial, and local health and safety inspectors.
- .3 Submit copies of incident and accident reports.

**1.5 SAFETY ASSESSMENT**

- .1 Perform site specific safety hazard assessment related to project.

**1.6 PROJECT/SITE CONDITIONS**

- .1 Work at site will involve contact with:
  - .1 Project Manager  
Tom Dunphy, Public Works and Government Service Canada  
604.775.6659  
[tom.dunphy@pwgsc-tpsgc.gc.ca](mailto:tom.dunphy@pwgsc-tpsgc.gc.ca)
  - .2 Consultant  
Matt Hope, WSP  
250.384.5510  
[matt.hope@wspgroup.com](mailto:matt.hope@wspgroup.com)
  - .3 Parks Manager  
Marvin Pearson, Parks Canada  
250.559.6321  
[Marvin.Pearson@pc.gc.ca](mailto:Marvin.Pearson@pc.gc.ca)

**1.7 RESPONSIBILITY**

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

**1.8 COMPLIANCE REQUIREMENTS**

- .1 Comply with current Occupational Health & Safety Regulations for BC.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

**1.9 UNFORESEEN HAZARDS**

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of the Province having jurisdiction and advise Departmental Representative verbally and in writing.

**1.10 HEALTH AND SAFETY CO-ORDINATOR**

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
  - .1 Have site-related working experience specific to activities associated with tank destructions and removal.
  - .2 Have working knowledge of occupational safety and health regulations.
  - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
  - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.

**1.11 POSTING OF DOCUMENTS**

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of British Columbia, and in consultation with Departmental Representative.

**1.12 CORRECTION OF NON-COMPLIANCE**

- .1 Immediately address health and safety non-compliance issues identified by Authority Having Jurisdiction or by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

**1.13 WORK STOPPAGE**

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

**PART 2 PRODUCTS**

**2.1 NOT USED**

**PART 3 EXECUTION**

**3.1 NOT USED**

**END OF SECTION**

**PART 1 GENERAL**

**1.1 GENERAL INSTRUCTIONS**

- .1 The General Instructions shall form part of this Section.
- .2 Be fully familiar with all aspects of the permits required for construction of the proposed works, as well as requirements stipulated by the Departmental Representative. All works shall be constructed in accordance with these permits and Departmental Representative requirements.

**1.2 FIRES**

- .1 Fires and burning of rubbish is not permitted on site.

**1.3 ARCHAEOLOGICAL PROTECTION**

- .1 All Native Indian artefacts and remains of Native Indian settlements are protected whether found on the ground surface or buried beneath the surface. All such remains and deposits are not to be disturbed until their significance has been assessed by an archaeologist to the satisfaction of the Departmental Representative.

**1.4 HAZARDOUS MATERIALS HANDLING AND STORAGE**

- .1 Hazardous materials including, but not limited to fuels, bitumen, cement, paints, solvent, cleaners, dust suppressants, used fuel and oil filters, and other construction materials shall be stored and handled to minimize loss and allow contaminant and recovery in the event of a spill.
- .2 Designate areas for the transfer and temporary storage of hazardous materials and wastes. The areas shall be clearly labelled and appropriately controlled. The designated areas shall be used by the contractor as a transfer and temporary storage area for potentially hazardous materials and wastes.
- .3 Maintain proper WHIMIS labels and MSDS for all hazardous materials used and stored on site.

**1.5 SPECIAL AND GENERAL WASTE, RUBBISH, AND GARBAGE**

- .1 Special wastes generated in the course of the construction activities shall be disposed of in compliance with the B.C. Special Waste Regulation. As defined by these regulations, special waste includes but is not limited to waste asbestos, oils, grease, lubricants, solvents, batteries, PCB's, paints, and used spill cleanup materials.
- .2 When handling, storing and removing Special Waste, the Contractor shall maintain the following records:
  - .1 Inventories of types and quantities of Special Wastes generated, stored or removed,
  - .2 Manifests identifying special waste haulers and disposal destinations.
  - .3 Disposal certification documents.
- .3 Non-hazardous solid wastes such as but not limited to, waste wood, asphalt, concrete, and metals shall be disposed of at an approved disposal facility in compliance with the B.C. Waste Management Act.
- .4 Establish regular clean up and disposal programs so as to prevent the excessive accumulation of solid waste and contain all garbage related to the project.
- .5 Do not bury rubbish and waste materials on site.

**1.6 SPILL PREVENTION AND EMERGENCY RESPONSE**

- .1 The Departmental Representative will provide procedures for spill response and emergency contact information.
- .2 Complete a daily visual inspection of all hazardous material and equipment for signs of leakage. Daily visual inspection will include, among other things ensuring that all protective equipment and other emergency response equipment is in its place.
- .3 Maintain a readily available supply of emergency spill response material and equipment, on site at all times, in effective working condition appropriate to the scale of the project.
- .4 Immediately deal with any spills which occur.
- .5 Report any environmental incident or spill/release of a substance to the Departmental Representative.

**PART 2 PRODUCTS**

**2.1 NOT USED**

**PART 3 EXECUTION**

**3.1 NOT USED**

**END OF SECTION**

## **PART 1 GENERAL**

### **1.1 PRODUCTS/MATERIAL AND EQUIPMENT**

- .1 Use NEW products/material and equipment unless otherwise specified. The term "products" is referred to throughout the specifications.
- .2 Use products of 1 manufacturer for material and equipment of the same type or classification unless otherwise specified.
- .3 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.
- .4 Notify Departmental Representative in writing of any conflict between these specifications and manufacturer's instructions. Departmental Representative will designate which document is to be followed.
- .5 Provide metal fastenings and accessories in the same texture, colour and finish as base metal in which they occur.
  - .1 Prevent electrolytic action between dissimilar metals.
  - .2 Use non-corrosive fasteners, anchors and spacers for securing exterior work.
- .6 Fastenings which cause spalling or cracking are not acceptable.
- .7 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .8 Use heavy hexagon heads, semi-finished unless otherwise specified.
- .9 Bolts may not project more than 1 diameter beyond nuts.
- .10 Types of washers as follows:
  - .1 Plain type washers: use on equipment and sheet metal.
  - .2 Soft gasket lock type washers: use where vibrations occur.
  - .3 Resilient washers: use with stainless steel.
- .11 Deliver, store and maintain packaged material and equipment with manufacturer's seals and labels intact.
- .12 Prevent damage, adulteration and soiling of products during delivery, handling and storage. Immediately remove rejected products from site.
- .13 Store products in accordance with suppliers' instructions.
- .14 Touch up damaged factory finished surfaces to Departmental Representative's satisfaction:
  - .1 Use primer or enamel to match original.
  - .2 Do not paint over nameplates.

### **1.2 QUALITY OF PRODUCTS**

- .1 Products, materials and equipment (referred to as products) incorporated into work shall be new, not damaged or defective, and of the best quality (compatible with the specifications) for the purpose intended. If requested, furnish evidence as to type, source and quality of the products provided.
- .2 Defective products will be rejected regardless of previous inspections.
  - .1 Inspection does not relieve responsibility, but is precaution against oversight or error.



- .2 Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Retain purchase orders, invoices and other documents to prove that all products utilized in this Contract meet the requirements of the specifications. Produce documents when requested by the Departmental Representative.
- .4 Should any dispute arise as to quality or fitness of products, the decision rests strictly with the Departmental Representative based upon the requirements of the Contract documents.
- .5 Unless otherwise indicated in the specifications, maintain uniformity of manufacture for any particular or like item throughout the building.
- .6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

### **1.3 AVAILABILITY OF PRODUCTS**

- .1 Immediately upon signing the Contract, review product delivery requirements and anticipate foreseeable supply delays for any items.
- .2 If delays in supply of products are foreseeable, notify Departmental Representative of such in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of the work.
- .3 In event of failure to notify Departmental Representative at the start of work and should it subsequently appear that the work may be delayed for such reason, the Departmental Representative reserves the right to substitute more readily available products of similar character, at no increase in either the Contract price or the Contract time.

### **1.4 MANUFACTURER'S INSTRUCTIONS**

- .1 Unless otherwise indicated in the specifications, install or erect products in accordance with the manufacturer's instructions.
  - .1 Do not rely on labels or enclosures provided with products.
  - .2 Obtain written instructions directly from the manufacturer.
- .2 Notify Departmental Representative in writing of conflicts between the specifications and the manufacturer's instructions so that the Departmental Representative may establish the course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes the Departmental Representative to require removal and re-installation at no increase in either the Contract price or the Contract time.

### **1.5 CONTRACTOR'S OPTIONS FOR SELECTION OF PRODUCTS FOR TENDERING**

- .1 Products are specified by "**Prescriptive**" specifications: select any product meeting or exceeding specifications.
- .2 Products specified under "**Acceptable Products**" (used for complex Mechanical or Electrical Systems): select any one of the indicated manufacturers, or any other manufacturer meeting or exceeding the Prescriptive specifications and indicated Products.
- .3 Products specified by performance and referenced standard: select any product meeting or exceeding the referenced standard.
- .4 Products specified to meet particular design requirements or to match existing materials: use only material specified Approved Product. Alternative products may be considered

provided full technical data is received in writing by Departmental Representative in accordance with "Special Instructions to Tenderers".

- .5 When products are specified by a referenced standard or by Performance specifications, upon request of Departmental Representative obtain from manufacturer and independent laboratory report showing that the product meets or exceeds the specified requirements.

#### **1.6 SUBSTITUTION AFTER CONTRACT AWARD**

- .1 No substitutions are permitted without prior written approval of the Departmental Representative.
- .2 **Proposals for substitution may only be submitted after Contract award.** Such request must include statements of respective costs of items originally specified and the proposed substitution.
- .3 Proposals will be considered by the Departmental Representative if:
  - .1 products selected by tenderer from those specified are not available;
  - .2 delivery date of products selected from those specified would unduly delay completion of Contract, or
  - .3 alternative product to that specified, which is brought to the attention of considered by Departmental Representative as equivalent to the product specified, and will result in a credit to the Contract amount.
- .4 Should the proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on the project. Pay for design or drawing changes required as result of substitution.
- .5 Amounts of all credits arising from approval of the substitutions will be determined by the Departmental Representative, and the Contract price will be reduced accordingly.

#### **PART 2 PRODUCTS**

##### **2.1 NOT USED**

#### **PART 3 EXECUTION**

##### **3.1 NOT USED**

**END OF SECTION**

**PART 1 OPERATION AND MAINTENANCE MANUAL**

**1.1 MANUAL**

- .1 An organized compilation of operating and maintenance data including detailed technical information, documents and records describing operation and maintenance of individual products or systems as specified in individual sections herein.

**1.2 GENERAL INSTRUCTIONS**

- .1 Assemble, coordinate, bind, and index required data into Operation and Maintenance Manual.
- .2 Submit two (2) copies of complete Operation and Maintenance manual to the Departmental Representative upon project completion.
- .3 Material: label each section with tabs protected with celluloid covers fastened to hard paper dividing sheets.
- .4 Type lists and notes.
- .5 Drawings, diagrams, and manufacturer's literature must be legible.

**1.3 BINDERS**

- .1 Binders: vinyl, hard covered, 3 "D" ring, loose leaf, sized for 215 x 280 mm paper, with spine pocket.
- .2 Identify contents of each binder on spine.

**1.4 CONTENTS**

- .1 Cover sheet containing:
  - .1 Date submitted.
  - .2 Project title, location, and project number.
  - .3 Names and addresses of Contractor and all subcontractors.
- .2 Table of Contents of all binders.
- .3 List of maintenance materials provided.
- .4 List of special tools provided.
- .5 List of spare parts provided.
- .6 Warranties, guarantees.
- .7 Copies of approvals and certificates.

**1.5 PRODUCT DATA**

- .1 Provide data as specified in individual sections of the Civil and Mechanical divisions.
  - .1 List of equipment including service depot.
  - .2 Nameplate information including equipment number, make, size, capacity, model number, and serial number.
  - .3 Parts list.
  - .4 Installation details.
  - .5 Operating instructions.
  - .6 Maintenance instructions for equipment.
  - .7 Maintenance instructions for finishes.
- .2 Shop drawings:
  - .1 One complete set of reviewed final shop drawings and product data.

**PART 2 PRODUCTS**

**2.1 NOT USED**

**PART 3 EXECUTION**

**3.1 NOT USED**

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED WORK**

- .1 Refer to every technical section for waste management and disposal.

**1.2 DEFINITIONS**

- .1 Waste Audit (WA): relates to projected waste generation. Involves controlled separation of waste.
- .2 Waste Reduction Workplan (WRW): a written report which addresses opportunities for reduction, re-use or recycling of materials.
- .3 Materials Source Separation Program (MSSP): consists of a series of ongoing activities to separate re-usable and recyclable waste material into material categories from other types of waste at point of generation.

**1.3 MATERIALS SOURCE SEPARATION**

- .1 Before project start-up, prepare Materials Source Separation Program. Provide separate containers for re-usable and/or recyclable materials of the following:
  - .1 Gypsum board.
  - .2 Metals.
  - .3 Wood.
  - .4 Plastics
  - .5 Other materials as indicated in technical sections.
- .2 Implement Materials Source Separation Program for waste generated on project in compliance with approved methods and as approved by Departmental Representative.
- .3 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.
- .4 Locate separated materials in areas which minimize material damage.

**1.4 DIVERSION OF MATERIALS**

- .1 Create a list of materials to be separated from the general waste stream and stockpiled in separate containers, to the approval of the Departmental Representative and consistent with applicable fire regulations.
  - .1 Mark containers.
  - .2 Provide instruction on disposal practices.

**1.5 STORAGE, HANDLING AND APPLICATION**

- .1 Do work in compliance with Waste Reduction Workplan.
- .2 Handle waste materials not re-used, salvaged, or recycled in accordance with appropriate regulations and codes.
- .3 Materials in separated condition: collect, handle, store on site, and transport off-site to an approved and authorized recycling facility.
- .4 Materials must be immediately separated into required categories for re-use or recycling.
- .5 Unless specified otherwise, materials for removal become the Contractor's property.
- .6 On-site sale of salvaged/recyclable material is not permitted.

- .7 **Provide Departmental Representative with receipts** indicating quantity of material delivered to landfill.
- .8 **Provide Departmental Representative with receipts** indicating quantity and type of materials sent for recycling.

**PART 2 PRODUCTS**

**2.1 NOT USED**

**PART 3 EXECUTION**

**3.1 NOT USED**

**END OF SECTION**

**PART 1 GENERAL**

**1.1 SUBMISSION**

- .1 Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- .2 Revise content of documents as required before final submittal.
- .3 2 weeks before substantial performance of the work for construction, submit to Departmental Representative 4 final copies of operation and maintenance manuals.
- .4 Ensure spare parts, maintenance materials and special tools provided are new, neither damaged nor defective, and of same quality and manufacture as products provided in work.
- .5 If requested, furnish evidence as to type, source and quality of products provided.
- .6 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

**1.2 FORMAT**

- .1 Organize data in the form of an instructional and electronic manual.
- .2 Binders: vinyl, hard covered, 3 "D" ring, loose leaf 219x279 mm with spine and face pockets.
- .3 Cover: identify each binder with typed or printed title "Project Record Documents"; list title of project and identify subject matter of contents.
- .4 Arrange content by systems under section numbers and sequence of Table of Contents.
- .5 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .6 Text: manufacturer's printed data, or typewritten data.
- .7 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

**1.3 CONTENTS, EACH VOLUME**

- .1 Table of contents – provide the following:
  - .1 Title of project.  
Date of submission.
  - .2 Names, addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
  - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system, list names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product data: mark each sheet to clearly identify products and component parts, and data applicable to installation. Delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

**1.4 AS-BUILT DOCUMENTS**

- .1 **Contract drawings** and shop drawings: legibly mark each item to record actual construction, including:
  - .1 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
  - .2 Field changes of dimension and detail.
  - .3 Changes made by change orders.
  - .4 Details not on original Contract drawings.
  - .5 References to related shop drawings and modifications.
- .2 **Contract Specifications:** legibly mark each item to record actual "Workmanship of Construction", including:
  - .1 Manufacturer, trade name, and catalogue number of each "Product/Material" actually installed, particularly optional items and substitute items.
  - .2 Changes made by addenda and change orders.
- .3 **As-built information:**
  - .1 Record changes in red ink.
  - .2 Mark on 1 set of drawings, specifications and shop drawings at completion of project and, before final inspection, neatly transfer notations to second set.
  - .3 Provide 1 set of CDs in AutoCAD, Revit and PDF file format with all as-built information on the CDs.
  - .4 Submit all sets for the Departmental Representative.

**1.5 EQUIPMENT AND SYSTEMS**

- .1 **Operating procedures** – include the following:
  - .1 Start-up, break-in, and routine normal operating instructions and sequences.
  - .2 Regulation, control, stopping, shutdown, and emergency instructions.
  - .3 Summer, winter, and any special operating instructions.
- .2 **Maintenance requirements** – list routine procedures:
  - .1 \_\_\_\_\_
  - .2 \_\_\_\_\_
  - .3 \_\_\_\_\_
  - .4 \_\_\_\_\_
- .3 Provide servicing and lubrication schedule, and list of lubricants required.
- .4 Include manufacturer's printed operation and maintenance instructions.
- .5 Include sequence of operation by controls manufacturer.
- .6 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .7 Provide installed control diagrams by controls manufacturer.
- .8 Provide Contractor's coordination drawings with installed colour coded piping diagrams.
- .9 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .10 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.



- .11 Additional requirements: as specified in individual specification Sections.

**1.6 MANUFACTURER'S DOCUMENTATION REPORTS**

- .1 When specified in individual Sections, require manufacturer to provide authorized representative to demonstrate operation of equipment and system, instruct Departmental Representative's indicated facility's personnel, and provide detailed written report that demonstration and instructions have been completed.
- .2 Departmental Representative will provide list of personnel to receive instructions, and will coordinate their attendance at agreed-upon times.

**1.7 SPARE PARTS**

- .1 Provide spare parts in quantities specified in individual specification Sections.
- .2 Provide items of same manufacture and quality as items in work.
- .3 Deliver to on-site location as directed; place and store.
- .4 Receive and catalogue all items. Submit inventory listing to the Departmental Representative. Include approved listings in maintenance manual.
- .5 Obtain receipt for delivered products and submit to Departmental Representative.

**1.8 MAINTENANCE MATERIALS**

- .1 Provide maintenance and extra materials in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in work.
- .3 Deliver to on-site location as directed; place and store.
- .4 Receive and catalogue all items. Submit inventory listing to the Departmental Representative. Include approved listings in maintenance manual.
- .5 Obtain receipt for delivered products and submit to Departmental Representative.

**1.9 SPECIAL TOOLS**

- .1 Provide special tools in quantities specified in individual specification Sections.
- .2 Provide items with tags identifying their associated function and equipment.
- .3 Deliver to location as directed; place and store.
- .4 Receive and catalogue all items:
  - .1 Submit inventory listing to the Departmental Representative.
  - .2 Include approved listings in maintenance manual.

**1.10 WARRANTIES, BONDS, TEST REPORTS, INSPECTION REPORTS**

- .1 Separate each Document with index tab sheets keyed to Table of Contents listing.
- .2 List subcontractor, supplier and manufacturer with name, address, and telephone number of responsible principal.
- .3 Obtain Warranties, Bonds, Test Results, Inspection Reports executed in duplicate by subcontractors, suppliers, manufacturers, and inspection agencies within 10 days after completion of the applicable item of work.
- .4 Except for items put into use with the Departmental Representative's permission, leave date of beginning of time of warranty until the date of substantial performance is determined.

- .5 Verify that documents are in proper form, contain full information, and are notarized.
- .6 Co-execute submittals when required.
- .7 Retain warranties and bonds until time specified for submittal.

**1.11 COMPLETION**

- .1 Submit a written certificate that the following have been performed:
  - .1 Work has been completed and inspected for compliance with the Contract documents.
  - .2 Defects have been corrected and deficiencies have been completed.
  - .3 Equipment and systems have been tested, adjusted and balanced, and are fully operational.
  - .4 Certificates required by the Boiler Inspection Branch, Fire Commissioner of Canada, and utility companies have been submitted.
  - .5 Operation of systems has been demonstrated to the personnel indicated by the Departmental Representative.
  - .6 Work is complete and ready for final inspection.

**PART 2 PRODUCTS**

**2.1 NOT USED.**

**PART 3 EXECUTION**

**3.1 NOT USED.**

**END OF SECTION**

**PART 1 GENERAL**

**1.1 SUMMARY**

- .1 Comply with requirements of this Section when performing following work:
  - .1 Permanent withdrawal from service, cleaning, removal, and disposal of:
    - .1 2270L day tank EC-0002906.
    - .2 2500L day tank EC-0002906.
    - .3 2500L day tank EC-0002908.
    - .4 2500L day tank EC-0002908.
    - .5 The tanks will be permanently withdrawn from service under this project and currently contain an unknown quantity of fuel oil and or sludge.
  - .2 Ensure all liquids and sludge are safely removed and disposed of and the tanks are cleaned and free of harmful vapours prior to transport and or destruction.
  - .3 Provide certificates of destruction for each tank with the required tank and system identification information.

**1.2 SECTION INCLUDES**

- .1 Requirements and procedures for fuel storage tank removal and disposal.

**1.3 RELATED REQUIREMENTS**

- .1 Section 01 35 29.06 – Health and Safety Requirements.

**1.4 REFERENCES**

- .1 Department of Justice Canada (Jus):
  - .1 Canadian Environmental Protection Act, 1999 (CEPA).
  - .2 Canada Gazette Part II, Vol 142, No 13 – “Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations” (June 12, 2008) annexed out of the Canadian Environmental Protection Act.
- .2 Canada Labour Code:
  - .1 Part II (September 2000) – Occupational Safety and Health Regulations.
- .3 Transport Canada (TC):
  - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).
- .4 National Fire Code of Canada (NFC) 2005.
- .5 Canadian Council of Ministers of the Environment (CCME):
  - .1 PN 1326 “Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products”.

**1.5 SUBMITTALS**

- .1 Submit to Departmental Representative a proposed Work Plan and schedule prior to commencing work.
- .2 The Departmental Representative will submit the required notification of the tank removal to the Dominion Fire Commissioner’s Office.
- .3 Submit to Departmental Representative any necessary permits for transportation and disposal of the used oil tanks and any associated waste materials. Any vapour level test readings should be included as well.

## **1.6 QUALITY ASSURANCE**

- .1 Regulatory Requirements:
  - .1 Perform work in accordance with all Federal, Provincial/Territorial, and local requirements pertaining to fuel storage tank removals. Regulations will include but are not limited to the most current editions of the following:
  - .2 National Fire Code - Section 4.3.15.
  - .3 Canada Gazette Part II, Vol 142, No 13 – “Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations” (June 12, 2008):
    - .1 Section 44. Permanent Withdrawal from Service.
    - .2 Section 45. Removal of Storage Tank Systems.
- .2 Health and Safety:
  - .1 Perform construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements
  - .2 Site Safety and Health Plan/Statement:

The Site Safety and Health Plan/Statement shall demonstrate that the contractor is aware of, and shall perform all work in accordance in full compliance with the requirements of Occupational Health and Safety, Canada Labour Code Part 2, and the Worker’s Compensation Act. In addition, the following safety precautions shall be enforced:

    - .1 Disconnect or remove source of ignition from vicinity of tank. Provide temporary protection for safe movement of personnel and vehicle traffic.
    - .2 Cut, braze or weld metal only in monitored areas established to be free of ignitable vapour concentrations.
    - .3 When necessary, ground and bond metal equipment, including tanks and transfer pipes, before operating equipment or transferring flammable materials.
    - .4 Use non-sparking tools and intrinsically safe electrical equipment.
    - .5 Smoking shall not be permitted in the worksite.
- .3 Safety Requirements: worker protection.
  - .1 Protective equipment and clothing to be worn by workers while in the tank removal Work Area.
- .4 Work Plan:

Prior to commencement of work, contractor shall prepare or present to the Departmental Representative their proposed Work Plan. The Work Plan is not limited to but should as a minimum include the following:

  - .1 Describe the methods, means, sequence, and schedule to be employed in the pumping, cleaning, de-vaporizing, testing, inspecting, cutting, and disposal for the fuel storage tanks and related piping, equipment and appurtenances.
  - .2 Include methods to be employed for any product storage; sludge and liquid removal; purging and inerting.

## **1.7 WASTE MANAGEMENT AND DISPOSAL**

- .1 Remove from site and dispose of all tanks piping and associated tank materials at appropriate recycling facilities.
- .2 Place materials defined as hazardous or toxic in designated containers.
- .3 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
- .4 Disposal of waste generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations. Dispose of waste oil in sealed leak proof drums at a licensed facility. Label containers with appropriate warning labels.

**1.8 EXISTING CONDITIONS**

- .1 Reports and information available pertaining to used oil tanks will be provided to the contractor upon request.

**PART 2 PRODUCTS**

**2.1 NOT USED.**

**PART 3 EXECUTION**

**3.1 GENERAL REQUIREMENTS**

- .1 Furnish labour, materials, necessary permits, and equipment to permanently withdraw from service and remove the fuel storage tanks; clean and vapour free the storage tanks and associated piping; and dispose of the fuel tanks, associated piping, and any remaining used oil/sludge tank contents.

**3.2 PERMANENT WITHDRAWAL FROM SERVICE**

- .1 System is to be permanently withdrawn from service by an ITA certified Petroleum Equipment Installer approved to do so in British Columbia or supervised by a Professional Engineer registered in BC.
- .2 The contractor must keep and provide to the Departmental Representative a record that includes the date on which they withdrew the system or component from service and that establishes that the fuel storage tank was withdrawn by an approved person or that the withdrawal was supervised by a Professional Engineer registered in BC.
- .3 The Contractor must ensure that:
  - .1 All liquids and sludge are removed and disposed of,
  - .2 The fuel storage tank is purged of vapours to less than 10% of the lower flammability limit and the presence of vapours is checked with a combustible gas meter, and
  - .3 The withdrawal is done in a way such that there will be no immediate or long-term harmful effect on the environment and it will not constitute a danger to human life or health.

**3.3 REMOVAL OF STORAGE TANK SYSTEMS**

- .1 System is to be permanently withdrawn from service by an ITA certified Petroleum Equipment Installer approved to do so in British Columbia or supervised by a Professional Engineer registered in BC.
- .2 The contractor must keep and provide to the Departmental Representative a record that includes the date on which the storage tank system or any associated components were removed. The record must state that the removal was done by an approved person or that the removal was supervised by a Professional Engineer registered in BC.
- .3 Contact the Departmental Representative immediately if there is evidence of contamination within the construction site.

**3.4 DRAINING**

- .1 Drain and flush piping into tank.
- .2 Pump out liquid from tanks using an explosion proof, air driven or hand pump.
- .3 Remove sludge from tank bottom.

- .4 Dispose of product and sludge in accordance with Federal, Provincial/Territorial, and local regulations. Waste disposal carrier to be licensed by Provincial Environmental Agency having jurisdiction.

**3.5 VAPOUR REMOVAL**

- .1 The contractor shall provide for the Departmental Representative's approval a written description of the procedure to be used for vapour removal.

**3.6 TANK REMOVAL FROM SITE**

- .1 Dispose of tank in accordance with Federal, Provincial/Territorial, and local regulations.
- .2 Tanks shall be removed from premises as promptly as possible after vapour removal. If tank remains at site overnight or longer, recheck vapour levels prior to transport and remove vapour if required.
- .3 Tanks shall not be reused. Cut suitable openings in the tanks to render tank unusable.
- .4 Ensure the tank is secured for transport with adequate venting at the top of the tank. 30mm minimum diameter is required for safe venting, however, larger vents are recommended.

**3.7 DISPOSAL REQUIREMENTS**

- .1 Perform disposal of all fluids and materials in accordance with all Federal, Provincial/Territorial, and local regulations.
- .2 Provide the Departmental Representative with certificates of destruction or disposal for each tank to be removed. Certificates must include the BC ID numbers, EC System numbers, date of removal and permanent withdrawal, and a record of the Professional Engineer who supervised the removal and permanent withdrawal for each tank.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED REQUIREMENTS**

- .1 Section 01 35 43 – Environmental Procedures.

**1.2 REFERENCES**

- .1 American Society for Testing and Materials International (ASTM).
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-19.24-M90, Multicomponent, Chemical-Curing Sealing Compound.
- .3 CSA International
  - .1 CSA A23.1/A23.2-2009, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CSA A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
    - .1 CSA-A3001-03, Cementitious Materials for Use in Concrete.
- .4 CAN/CSA-G30.18-09, Billet-Steel Bars for Concrete Reinforcement.

**1.3 SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Provide testing results and reports for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters are found.
- .3 Concrete hauling time: provide for review by Departmental Representative deviations exceeding maximum allowable time of 120 minutes for concrete to be delivered to site of Work and discharged after batching.

**1.4 QUALITY ASSURANCE**

- .1 Submit to Departmental Representative minimum 4 weeks prior to starting concrete work, mix designs.
- .2 Quality Control Plan: provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS.
- .3 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 33 Health and Safety Requirements.

**1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Delivery and Acceptance Requirements:
  - .1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
    - .1 Do not modify maximum time limit without receipt of prior written agreement from the Departmental Representative and concrete producer as described in CSA A23.1/A23.2.
    - .2 Deviations to be submitted for review by the Departmental Representative.
  - .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

## 1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
- .2 Ensure emptied containers are sealed and stored safely.
- .3 Divert unused concrete materials from landfill to local facility as reviewed by Departmental Representative.
- .4 Provide appropriate area on job site where concrete trucks can be safely washed.
- .5 Divert admixtures and additive materials from landfill to approved official hazardous material collection site as reviewed by Departmental Representative.
- .6 Unused admixtures and additive materials must not be disposed of into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- .1 Cement: to CSA A3001, Type GU.
- .2 Supplementary cementing materials: with minimum 20% fly ash replacement GGBFS, by mass of total cementitious materials to CSA A3001.
- .3 Water: to CSA A23.1.
- .4 Reinforcing bars to CAN/CSA-G30.18, Grade 400.
- .5 Other concrete materials: to CSA-A23.1/A23.2.

### 2.2 MIXES

- .1 Proportion normal density concrete in accordance with CAN/CSA-A23.1, to requirements given on the drawings and the following:

#### TYPE 1 MIX

- |     |  |                                |
|-----|--|--------------------------------|
| .1  | Cement:  | Type GU Portland cement.       |
| .2  | Minimum compressive strength at 28 days:   | 25MPa.                         |
| .3  | Fly ash content:   | Minimum 30%.                   |
| .4  | Class of exposure:   | N                              |
| .5  | Nominal size of coarse aggregate:  | 20 mm.                         |
| .6  | Slump at time and point of discharge:  | 80 mm ± 20mm.                  |
| .7  | Air content:   | 4 - 7%.                        |
| .8  | Chemical admixtures: type WN water reducing agent to manufacturer's recommended dosage in accordance with CAN3-A266.4-M78. |                                |
| .9  | Air-dry density:   | Minimum 2300 kg/m <sup>3</sup> |
| .10 | Maximum water/cement ratio:  | .55                            |



TYPE 2 MIX

.1	Cement:	Type GU Portland cement.
.2	Minimum compressive strength at 28 days:	32 MPa.
.3	Supplementary cementitious materials:	Maximum 20% of cementitious content.
.4	Class of exposure:	C-2
.5	Nominal size of coarse aggregate:	20 mm.
.6	Slump at time and point of discharge:	80 mm ± 20mm.
.7	Air content:	5 - 8%.
.8	Chemical admixtures: type WN water reducing agent to manufacturer's recommended dosage in accordance with CAN3-A266.4-M78	
.9	Air-dry density:	Minimum 2300 kg/m <sup>3</sup>
.10	Maximum water/cement ratios:	.45

MIX LOCATIONS

Type 1 - Typical unless noted otherwise.  
Type 2 – Exterior concrete slabs on grade.

**PART 3 EXECUTION**

**3.1 PREPARATION**

- .1 Provide Departmental Representative 48 hours notice before placing concrete.
- .2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 During concreting operations:
  - .1 Development of cold joints not allowed.
  - .2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.
- .4 Protect previous Work from staining.
- .5 Clean and remove stains prior to application for concrete finishes.

**3.2 CONSTRUCTION**

- .1 Perform cast-in-place concrete work to CSA A23.1/A23.2.

**3.3 INSERTS**

- .1 Cast in sleeves, ties, slots, anchors, reinforcement, frames, conduit, bolts, waterstops, joint fillers and other inserts required to be built-in.
  - .1 Sleeves and openings greater than 100 mm x 100 mm not indicated, must be reviewed by Departmental Representative

**3.4 FINISHES**

- .1 Formed surfaces exposed to view: smooth as cast in accordance with CSA A23.1/A23.2.
- .2 Interior floor slabs requiring smooth surface: initial finishing operations followed by final finishing comprising mechanical floating and steel trowelling as specified in CSA-A23.1/A23.2 to produce hard, smooth, dense trowelled surface free from blemishes.
- .3 Equipment pads: provide smooth trowelled surface.
- .4 Pavements, walks, curbs and exposed site concrete:
  - .1 Screed to place surfaces and use aluminum floats.
  - .2 Provide round edges and joint spacing using standard tools.

.3 Trowel smooth to provide lightly brushed non-slip finish.

**3.5 CONTROL JOINTS**

.1 Control joints in slabs on grade at locations indicated, in accordance with CSA-A23.1/A23.2 and install specified joint sealer/filler.

**3.6 CURING**

.1 Use curing compounds compatible with applied finish on concrete surfaces free of bonding agents and in accordance with CSA A23.1/A23.2.

**3.7 SITE TOLERANCE**

.1 Concrete floor slab finishing tolerance in accordance with CSA A23.1/A23.2.

**3.8 FIELD QUALITY CONTROL**

.1 Concrete Testing: to CSA/A23.1/A23.2 by testing laboratory designated and paid for by Departmental Representative.

**3.9 CLEANING**

.1 Use trigger operated spray nozzles for water hoses.

.2 Designate cleaning area for tools to limit water use and runoff.

.3 Cleaning of concrete equipment to be done in accordance with Section 01 35 43 – Environmental Procedures.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 01 35 29.06 - Health and Safety Requirements
- .3 Section 01 35 43 – Environmental Procedures
- .4 Section 02 65 00 – Fuel Storage Tank Removal

**1.2 REFERENCES**

- .1 All work covered by this Section shall be carried out in accordance with, but not limited to the most current edition of the following standards, which shall be deemed to be and form part of this specification.
- .2 American Society of Mechanical Engineers (ASME)
  - .1 ASME-B16.3, Malleable-Iron Threaded Fittings: Classes 150 and 300.
  - .2 ASME-B16.9, Factory-Made Wrought Steel Butt welding Fittings.
- .3 ASTM International
  - .1 ASTM A47/A47M-99, Standard Specification for Ferritic Malleable Iron Castings.
  - .2 ASTM A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless.
  - .3 ASTM B61, Standard Specification for Steam or Valve Bronze Castings.
  - .4 ASTM B75M, Standard Specification for Seamless Copper Tube [Metric].
- .4 Canadian Environmental Protection Act (CEPA)
  - .1 CCME PN 1326, Environmental Code of Practice for Aboveground and Underground Storage Tank Systems for Petroleum Products and Allied Petroleum Products.
- .5 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .6 National Fire Code of Canada
- .7 Applicable Municipal and Regional Codes.

**PART 2 PRODUCTS**

**2.1 MATERIALS**

- .1 Steel Pipe - Class 150:
  - .1 Steel pipe, valves and fittings shall meet the following requirements:
    - .1 40mm and down - Steel, seamless, Schedule 80, API 5L, Gr.B threaded or socket ends.
    - .2 50mm - Steel, seamless, XS, API 5L Gr.B plain or B.W. ends.
  - .2 Stainless Steel Pipe - 304L, Schedule 40.
  - .3 Flexible Metal Hoses: 316SS tube with SS overbraid.
  - .4 Fittings:
    - .1 40mm and down - ANSI Class 3000 CWP, steel, A-105 forged, threaded or socket.
    - .2 50mm - B.W., carbon steel, std. Wt., A-234 Gr.WPB.

## **2.2 JOINTING MATERIAL**

- .1 Screwed fittings: Teflon tape.

## **2.3 BALL VALVES**

- .1 NPS 2 and under: bronze body, screwed ends, TFE seal, hard chrome ball, 4 MPa.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION - GENERAL**

- .1 All work to meet local and Federal codes and regulations, installed and tested to the satisfaction of governing fire authority and Departmental Representative.
- .2 Piping to be installed fitted and tested only by a petroleum pipe fitter of journeyman status.
- .3 All piping must be flushed and pressure tested.
- .4 All threaded connections must be made up with Teflon tape or pipe dope.
- .5 The use of close nipples is not permitted.
- .6 The use of street elbows or 45 degree elbows for swing joints is not permitted.
- .7 The Contractor shall follow the drawings in all matters concerning the location and placement of all pipe, valves, fittings and supports, and no changes are to be made from the drawings without written permission from the Departmental Representative.
- .8 Pipe shall be adequately supported to prevent abnormal stress from being imposed on equipment. Inaccuracies in pipe fabrication causing stress to be imposed on the equipment will not be permitted. The Departmental Representative reserves the right, if he deems it desirable, to have flanged joints unbolted at the equipment flanges to determine if there is any misalignment. Unsatisfactory workmanship shall be corrected by re-adjustment of pipe supports, anchor points, or re-fabrication.
- .9 All pipe and fittings must be swabbed clean (i.e. wire with a rag) prior to their assembly.
- .10 After a pipe or fitting has been swabbed, plug the end with a rag or other device.
- .11 Pipes shall be accurately cut to length so as to permit normal thread engagement between male and female threads.
- .12 Threads shall be tapered and smooth, cut with the correct taper, lead, thread angle and diameter and shall conform to NPT (A.S.A.-B2-1-1945).
- .13 After completion of installation, all scale, dirt, welding electrodes, slag, rags and other foreign materials shall be removed from the lines.
- .14 Each joint shall be cleaned to remove dirt, loose mill scale or foreign substances before placing pipe in alignment for welding.
- .15 Pipe not yet in use or in material stock pile on site shall be plugged with a rag or similar device to prevent foreign material from entering the pipe.
- .16 All practical precautions shall be taken to prevent the introduction of foreign material into instruments, valves, meters, loaders, pumps and any other equipment.

### **3.2 ABOVEGROUND PIPE INSTALLATION**

- .1 Pipelines located aboveground wherever possible, in parallel banks, plumb and true to provide a neat, orderly arrangement.

- .2 Pipeline runs located as shown on drawings. Spaced centre to centre.
  - .1 40 mm and smaller - 150 mm C.C.
  - .2 50 mm - 200 mm C.C.
- .3 Pipe Supports
  - .1 Pipe supports/hangers shall be provided to support lines from 12 mm to 75 mm diameter every 2400 mm minimum and 100 mm to 300 mm diameter every 6500 mm or as shown on drawings.
  - .2 If variations to .1 above are indicated on the drawings, the drawings shall govern.

### **3.3 INSPECTION AND TESTING**

- .1 The Contractor's work shall be available for inspection at any time by the Departmental Representative. All work shall be in accordance with and inspected and tested to meet the requirements of the standards specified.
- .2 Contractor shall test valves for shut off and operation, and check packing for leakage.
- .3 Defects disclosed in the work shall be made good or the work replaced without additional cost to the Departmental Representative.
- .4 Pressure testing shall be carried out as follows:
  - .1 The following piping and equipment shall not be subjected to field pressure testing:
    - .1 Tanks.
    - .2 Rotating machinery, such as pumps.
    - .3 Strainers and filter elements.
    - .4 Pressure relieving devices, such as pressure relief valves.
    - .5 Any equipment which does not have a specific test pressure at least as great as the piping test pressure.
    - .6 Instruments such as pressure gauges and differential pressure gauges.
    - .7 Meters, hoses, Carter adapters, and quick couplings.
    - .8 Control valves.
    - .9 Any other equipment designated by the Departmental Representative.
  - .2 Two or more lines may be combined into one test system.
  - .3 While piping is under test, care shall be taken to ensure that excessive pressure does not occur due to an increase in ambient temperature.
  - .4 Where repairs are necessary, lines shall be retested satisfactorily prior to acceptance by the Departmental Representative.
  - .5 All piping joints shall be left unpainted and unwrapped or sleeved until after completion of field pressure testing.
- .5 Test Procedures
  - .1 The Contractor's work shall be available for inspection at any time by the Departmental Representative. All work shall be in accordance with and inspected and tested to meet the requirements of the standards specified.
  - .2 Contractor shall test valves for shut-off and operation, and check packing for leakage.
  - .3 Defects disclosed in the work shall be made good or the work replaced without additional cost to the Departmental Representative.
- .6 Pressure testing of steel piping systems shall be carried out as follows:
  - .1 Provide 10 working days notice to the Departmental Representative of test. Tests shall be witnessed by the Project Engineer.

- .2 Calibration records for gauges used for testing shall be provided to the Departmental Representative.
- .3 Test records shall be kept by the Contractor of each line or system of lines tested.
- .4 Piping shall not be pressure tested at metal temperatures below 2 degrees C (35 degrees F) without specific approval by the Departmental Representative.
- .5 Supply and install all blind flanges, fittings, gauges and pumps as necessary for tests.
- .6 Pressure test piping systems to 345 KPa (50 psi) and hold for a minimum of 2 hours.
- .7 Repair and retest if required.
- .7 Repairs to piping systems shall be made with new material. No caulking or screwed joints, cracks, or holes will be acceptable. Where it becomes necessary to replace pieces of pipe, such replacements shall be the same lengths as the defective pieces.
- .8 Tests shall be repeated after any work has been replaced, if in the judgment of the Departmental Representative it is necessary.
- .9 Pipe joints shall remain exposed until the pressure test has been successfully completed.

### **3.4 APPLICATION**

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

### **3.5 PIPING**

- .1 Install piping in accordance with Section [23 05 05 - Installation of Pipework], supplemented as specified.
- .2 Install oil piping system in accordance with CCME, CEPA SOR/2008-197, and NFCC.
- .3 Slope piping down in direction of storage tank unless otherwise indicated.
- .4 Above ground piping to be protected from physical impact.
- .5 Piping at tanks:
  - .1 Suction: terminate 100 mm from bottom of tank with anti-siphon valve.
  - .2 Comply with CCME, CEPA SOR/2008-197, and NFCC..
- .6 Clearly label piping runs in legible form indicating:
  - .1 Piping product content.
  - .2 Direction of flow.
  - .3 Identify transfer points in piping systems to CPPI Colour-Symbol System to Mark Equipment and Vehicles for Product Identification

### **3.6 VALVES**

- .1 Install valves with stems upright or horizontal unless approved otherwise by the Departmental Representative.
- .2 Install ball valves at branch take-offs, to isolate pieces of equipment and as indicated.

### **3.7 OIL FILTERS**

- .1 Install existing filter in supply line to pump.
- .2 At time of acceptance, replace filter cartridge with new.

**3.8 FIELD QUALITY CONTROL**

- .1 Site Tests/inspection:
  - .1 Test system to Departmental Representative.
  - .2 Isolate tanks from piping pressure tests.

**3.9 CLEANING**

- .1 Clean in accordance with manufacturer's written recommendations, supplemented as follows:
  - .1 Flush after pressure test with a minimum of 20 litres of gasoline. Clean strainers and filters.
  - .2 Dispose of gasoline used for flushing out in accordance with requirements of authority having jurisdiction.
  - .3 Ensure vents from regulators, control valves are terminated in approved location and are protected against blockage and damage.
  - .4 Ensure entire installation is approved by the Departmental Representative.
  - .5 Clean to remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for reuse and/or recycling in accordance with local regulations.

**3.10 PIPELINE PAINTING**

- .1 Painting and coating shall be performed after inspection and hydrostatic inspection of the pipe.
- .2 Surface preparation: as per paint manufacturer's recommendations.
- .3 Two Coats General Paint 16 Line – White  
or approved alternate.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 26 05 21 – Wire and Cables (0 – 1000V)
- .3 Section 26 05 28 – Grounding – Secondary

**1.2 REFERENCES**

- .1 Canadian Standards Association (CSA International)
  - .1 CSA C22.1-12, Canadian Electrical Code, Part 1 (20th Edition), Safety Standard for Electrical Installations.
  - .2 CAN3-C235-83(R2000), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
- .2 Electrical and Electronic Manufacturer's Association of Canada (EEMAC)
  - .1 EEMAC 2Y-1-1958, Light Gray Colour for Indoor Switch Gear.
- .3 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC).
  - .1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

**1.3 DEFINITIONS**

- .1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

**1.4 DESIGN REQUIREMENTS**

- .1 Operating voltages: to CAN3-C235.
- .2 Any reference to Codes, Standards, and Regulations in these Specifications shall be taken as the latest or the most current in effect at time of tender.
- .3 Comply with all requirements of the NFPA 30A , British Columbia Building Code, Workers' Compensation Board requirements, and the CSA C22.1 Canadian Electrical Code - Part I, including all Provincial and other amendments, Electrical Bulletins, and any local by-laws or rules regulating the installation of electrical equipment and their seismic restraint. In no instance, however, shall the standards established by the Contract Documents be reduced by any of these Codes or Regulations.
- .4 All equipment and materials shall bear the approval of the Canadian Standards Association and where applicable, the Underwriters' Laboratories of Canada or alternate shall bear local approval from the Electrical Inspection Department having jurisdiction. Include in the Tender all costs associated with obtaining local approvals.
- .5 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
  - .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
- .6 Language operating requirements: provide identification nameplates and labels for control items in English.

**1.5 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: submit WHMIS MSDS in accordance with Section 01 35 43 – Environmental Procedures.



- .3 Shop drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of British Columbia, Canada.
  - .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.
  - .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
  - .4 Indicate on drawings clearances for operation, maintenance, and replacement of operating equipment devices.
  - .5 Submit 2 copies of 600 x 600 mm minimum size drawings and product data to inspection authorities.
  - .6 If changes are required, notify Departmental Representative of these changes before they are made.
- .4 Provide CSA certified equipment and material.
  - .1 Where CSA certified equipment and material is not available, submit such equipment and material to authority having jurisdiction for special approval before delivery to site.
  - .2 Submit test results of installed electrical systems and instrumentation.
  - .3 Permits and fees: in accordance with General Conditions of contract.
  - .4 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Departmental Representative.
- .5 Manufacturer's Field Reports: submit to Departmental Representative manufacturer's written report, within 3 days of review, verifying compliance of Work and electrical system and instrumentation testing.

#### **1.6 QUALITY ASSURANCE**

- .1 Qualifications: electrical Work to be carried out by qualified, licensed electricians who hold valid Master Electrical Contractor license or apprentices as per the conditions of Provincial Act respecting manpower vocational training and qualification.
  - .1 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.
  - .2 Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.
- .2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

#### **1.7 DELIVERY, STORAGE AND HANDLING**

- .1 Material Delivery Schedule: provide Departmental Representative with schedule within 2 weeks after award of Contract.

#### **1.8 SYSTEM STARTUP**

- .1 Instruct Departmental Representative and operating personnel in operation, care and maintenance of systems, system equipment and components.
- .2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.
- .3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.

#### **1.9 OPERATING INSTRUCTIONS**

- .1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.

- .2 Operating instructions to include following:
  - .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
  - .2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.
  - .3 Safety precautions.
  - .4 Procedures to be followed in event of equipment failure.
  - .5 Other items of instruction as recommended by manufacturer of each system or item of equipment.
- .3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.
- .4 Post instructions where directed.
- .5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.
- .6 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

**PART 2 PRODUCTS**

**2.1 MATERIALS AND EQUIPMENT**

- .1 Material and equipment to be CSA certified. Where CSA certified material and equipment are not available, obtain special approval from authority having jurisdiction before delivery to site and submit such approval as described in PART 1 - SUBMITTALS.
- .2 Factory assemble control panels and component assemblies.

**2.2 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS**

- .1 Verify installation and co-ordination responsibilities related to motors, equipment and controls, as indicated.
- .2 Refer to mechanical drawings for pump and hose reel motors.

**2.3 WARNING SIGNS**

- .1 Warning Signs: in accordance with requirements of authority having jurisdiction.

**2.4 WIRING TERMINATIONS**

- .1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

**2.5 EQUIPMENT IDENTIFICATION**

- .1 Identify electrical equipment with nameplates and labels as follows:
  - .1 Nameplates: lamicoid 3 mm thick plastic engraving sheet, matt white finish face, black core, lettering accurately aligned and engraved into core mechanically attached with self tapping screws.
  - .2 Sizes as follows:

NAMEPLATE SIZES			
Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters

- .2 Labels: embossed plastic labels with 6mm high letters unless specified otherwise.
- .3 Wording on nameplates and labels to be approved by Departmental Representative prior to manufacture.
- .4 Allow for minimum of twenty-five (25) letters per nameplate and label.
- .5 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
- .6 Disconnects, starters and contactors: indicate equipment being controlled and voltage.
- .7 Terminal cabinets and pull boxes: indicate system and voltage.
- .8 Transformers: indicate capacity, primary and secondary voltages.

**2.6 WIRING IDENTIFICATION**

- .1 Identify wiring with permanent indelible identifying markings, numbered, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour coding: to CSA C22.1.
- .4 Use colour coded wires in communication cables, matched throughout system.

**2.7 CONDUIT AND CABLE IDENTIFICATION**

- .1 Colour code conduits, boxes and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.
- .3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red
Telephone	Green	
Other Communication Systems	Green	Blue
Fire Alarm	Red	
Emergency Voice	Red	Blue
Other Security Systems	Red	Yellow

**2.8 FINISHES**

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.

**2.9 FIRESTOPPING**

- .1 Firestopping shall be performed by the Division 26 Contractor as required by the BC Building Code.
- .2 Rated sealing systems for penetrations of Fire Rated walls, ceilings and floors: Hilti, Nuco, PFP Partners, Flamesafe, or 3M. Contractors are to submit ULC, cUL, WHI, or equivalent certified Design or System Data Sheets to demonstrate compliance of a particular Floor or Wall Assembly, Through Penetrant, and Sealant with requirements and for what period of time.
- .3 Submit product data of the proposed firestopping system for review prior to installation.

- .4 The Departmental Representative, at his discretion, shall disassemble up to 10% of the total firestopping assemblies for detailed inspection. The contractor shall make good the inspected firestopping assemblies at no cost to the project.
- .5 Should any of the inspected firestopping assemblies not comply with the manufacturer's assembly instructions or the BC Building Code requirements, all firestopping assemblies shall be removed and replaced by the Division 26 Contractor at no cost to the client.
- .6 All firestop penetrations shall be labelled. Labels shall be secured to surface directly beside firestop penetration. Firestop penetration labels shall include the following information:
  - .1 Name of installer
  - .2 Date of installation
  - .3 Type of sealing
  - .4 Time duration of sealant

### **PART 3 EXECUTION**

#### **3.1 INSTALLATION**

- .1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.
- .2 Do overhead and underground systems in accordance with CSA C22.3 No.1 except where specified otherwise.
- .3 Install equipment as indicated on Drawings.
- .4 Locations of all existing services, features and appurtenances shown on the drawings are to be considered approximate only. Verify all locations in the field prior to construction.

#### **3.2 NAMEPLATES AND LABELS**

- .1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

#### **3.3 CONDUIT AND CABLE INSTALLATION**

- .1 Install conduit and sleeves prior to pouring of concrete.
  - .1 Sleeves through concrete: plastic, sized for free passage of conduit, and protruding 50 mm.
- .2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.
- .3 Install cables, conduits and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.

#### **3.4 MOUNTING HEIGHTS**

- .1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.
- .2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

**3.5 FIELD QUALITY CONTROL**

- .1 Manufacturer's Field Services:
  - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
  - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
  - .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

**3.6 CLEANING**

- .1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED REQUIREMENTS**

- .1 Section 26 05 00 - Common Work Results for Electrical.

**1.2 REFERENCES**

- .1 CSA C22.2 No. 0.3 (latest edition) – Test Methods for Electrical Wires and Cables.
- .2 CSA C22.2 No. 65 – Wire Connectors.

**1.3 PRODUCT DATA**

- .1 Provide product data in accordance with Section 01 33 00 – Submittal Procedures.

**PART 2 PRODUCTS**

**2.1 WIRES**

- .1 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.
- .2 Copper conductors: size as indicated, with 600V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE, Jacketted.
- .3 All branch circuits shall be installed with separate, dedicated neutrals.
- .4 All wiring shall be rated at 75°C when connected to equipment rated 75°C.
- .5 All wiring shall be listed for the application for which it is installed.

**2.2 TECK 90 HL CABLE**

- .1 Cable: in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Conductors:
  - .1 Size as indicated on Drawings.
  - .2 Grounding conductor: copper
  - .3 Circuit conductors: copper, size as indicated.
  - .4 Rated for hazardous areas as indicated on Drawings.
- .3 Insulation: Chemically cross-linked thermosetting polyethylene, type RW90, rated 600 V.
- .4 Inner jacket: polyvinyl chloride material.
- .5 Armour: interlocking aluminum.
- .6 Overall covering: thermoplastic polyvinyl chloride, compliant to applicable Building Code classification for this project.
- .7 Fastenings:
  - .1 One hole steel straps to secure surface cables 50 mm and smaller. Two hole steel straps for cables larger than 50 mm.
  - .2 Channel type supports for two or more cables at 2000 mm centers.
  - .3 Threaded rods: 6 mm diameter to support suspended channels.
- .8 Connectors:
  - .1 Watertight, explosion-proof approved for TECK cable.

### **2.3 OUTDOOR FLEXIBLE CABLES**

- .1 Approved for wet locations.
- .2 Insulation: 90<sup>o</sup> EPDM, type SOOW, rated 600V.

### **2.4 WIRE AND BOX CONNECTORS AND MISCELLANEOUS MATERIALS**

- .1 Connectors for wire and cable splices and taps: minimum standard of acceptance: use 3M Co. 'Scotchlok', Thomas & Betts PT Series, Buchanan 'B', or IDI Electric 'Super Nut', for conductors #8 AWG or smaller; Burndy 'Servit' Type KSU for conductors #1/0 AWG and smaller; and Burndy 'OKlip' Type KVSU for conductors 750 MCM or smaller.
- .2 Clamps, glanding connectors, or box connectors for armoured cable, aluminum sheathed cable, mineral-insulated cable, flexible conduit, as required.
- .3 Lugs, terminals, screws used for termination of wiring shall be suitable for either copper or aluminum conductors.
- .4 Plastic electrical insulation tape: minimum standard of acceptance is Scotch #88.
- .5 Kellems grips: double-eye, double-weave, stainless steel.

## **PART 3 EXECUTION**

### **3.1 FIELD QUALITY CONTROL**

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Perform tests using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction over installation.
- .3 Perform tests before energizing electrical system.

### **3.2 GENERAL CABLE INSTALLATION**

- .1 All wiring shall be in conduit unless otherwise indicated.
- .2 Install cable in trenches in accordance with the Canadian Electrical Code and the Drawings.
- .3 Terminate cables in accordance with the Canadian Electrical Code.
- .4 Cable Colour Coding: to Section 26 05 00 - Common Work Results for Electrical.
- .5 Conductor length for parallel feeders to be identical.
- .6 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.
- .7 Wiring in walls: typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.
- .8 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend. Obtain wiring diagram for control wiring.

### **3.3 INSTALLATION OF WIRES**

- .1 Install wiring in accordance with the Canadian Electrical Code.
- .2 The number of splices in any circuit shall be kept to an absolute minimum consistent with available coil length and installation conditions.
- .3 Branch circuits shall be sized for a maximum 3% voltage drop.

- .4 Install cable in trenches in accordance with the Canadian Electrical Code and the Drawings.
- .5 Cable Color Coding: to Section 26 05 00 Common Work Results for Electrical.

**3.4 INSTALLATION OF TECK90 HL CABLE (0 -1000 V)**

- .1 Group cables wherever possible on channels.
- .2 Install cable exposed, securely supported by straps.
- .3 Provide adequate protection and strain relief for cables between stub-up and devices.
- .4 All cables shall include grounding conductor.

**3.5 INSTALLATION OF FLEXIBLE CABLES**

- .1 Install flexible cables in existing raceways to dock.

**3.6 INSTALLATION OF WIRE AND BOX CONNECTORS**

- .1 Remove insulation carefully from ends of conductors and:
  - .1 Install mechanical pressure-type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2 No. 65.
  - .2 Install fixture type connectors and tighten. Replace insulating cap.
- .2 Wire and cable splices and taps shall be made with approved connectors used in accordance with the manufacturer's instructions.
- .3 After installation, wrap connectors having exposed conductive surfaces with plastic electrical tape, applying enough servings to provide uniform covering not thinner than the insulation of the largest conductor connected and overlapping the insulation of each connected conductor by not less than 12mm.

**END OF SECTION**



**PART 1 GENERAL**

**1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00 – Submittal Procedures.

**1.2 REFERENCES**

- .1 American National Standards Institute /Institute of Electrical and Electronics Engineers (ANSI/IEEE)
  - .1 ANSI/IEEE 837-02, IEEE Standard for Qualifying Permanent Connections Used in Substation Grounding.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for grounding equipment and include product characteristics, performance criteria, physical size, finish and limitations.

**1.4 CLOSEOUT SUBMITTALS**

- .1 Operation and Maintenance Data: submit operation and maintenance data for grounding equipment for incorporation into manual.

**1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect grounding equipment from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

**PART 2 PRODUCTS**

**2.1 EQUIPMENT**

- .1 Copper conductor: minimum 6 m long for each concrete encased electrode, bare, stranded, soft annealed, size as indicated on drawings.
- .2 Rod electrodes: stainless steel 19 mm diameter by minimum 3 m long.
- .3 Plate electrodes: galvanized steel surface area 0.2 m<sup>2</sup>, minimum 6 mm thick.
- .4 Grounding conductors: bare stranded copper, soft annealed, size as indicated.
- .5 Insulated grounding conductors: green, copper conductors, size as indicated.
- .6 Ground bus: copper, size as indicated, complete with insulated supports, fastenings, connectors.

- .7 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:
  - .1 Grounding and bonding bushings.
  - .2 Protective type clamps.
  - .3 Bolted type conductor connectors.
  - .4 Thermit welded type conductor connectors.
  - .5 Bonding jumpers, straps.
  - .6 Pressure wire connectors.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for grounding equipment installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

#### **3.2 INSTALLATION GENERAL**

- .1 Install complete permanent, continuous grounding system including, electrodes, conductors, connectors, accessories.
- .2 Install connectors in accordance with manufacturer's instructions.
- .3 Protect exposed grounding conductors from mechanical injury.
- .4 Make buried connections, and connections to conductive water main, electrodes, using copper welding by thermit process, permanent mechanical connectors or inspectable wrought copper compression connectors to ANSI/IEEE 837.
- .5 Use mechanical connectors for grounding connections to equipment provided with lugs.
- .6 Soldered joints not permitted.
- .7 Minimum depth of burial for ground loop and grounding cables shall be minimum 450mm, maximum 600mm.
- .8 Install bonding wire for flexible conduit, connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.
- .9 Install flexible ground straps for bus duct enclosure joints, where such bonding is not inherently provided with equipment.
- .10 Bond single conductor, metallic armoured cables to cabinet at supply end.
- .11 Ground secondary service pedestals.

#### **3.3 MAINTENANCE HOLES**

- .1 Install conveniently located grounding stud, electrode, size as indicated stranded copper conductor in each manhole.
- .2 Install ground rod in each manhole so that top projects through bottom of manhole. Provide with lug to which grounding connection can be made. Confirm ground resistance meets or exceeds Canadian Electrical Code minimum requirements.

**3.4 ELECTRODES**

- .1 Install rod and plate electrodes and make grounding connections as indicated.
- .2 Bond separate, multiple electrodes together.
- .3 Use size 2/0 AWG copper conductors for connections to electrodes.
- .4 Make special provision for installing electrodes that will give acceptable resistance to ground value where rock or sand terrain prevails. Ground as indicated.

**3.5 FIELD QUALITY CONTROL**

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction over installation.
- .3 Perform tests before energizing electrical system.

**3.6 CLEANING**

- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 REFERENCES**

- .1 Canadian Standards Association (CSA International)
  - .1 CAN/CSA C22.2 No. 18.2-06, Nonmetallic Outlet Boxes.
  - .2 CSA C22.2 No. 45.1-07, Rigid Metal Conduit – Steel.
  - .3 CSA C22.2 No. 56-04 (R2009), Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
  - .4 CSA C22.2 No. 83-M1985(R2008), Electrical Metallic Tubing.
  - .5 CSA C22.2 No. 211.2-06(R2011), Rigid PVC (Unplasticized) Conduit.
  - .6 CAN/CSA C22.2 No. 227.3-05(R2010), Nonmetallic Mechanical Protection Tubing (NMPT), A National Standard of Canada (February 2006).

**1.2 SUBMITTALS**

- .1 Provide shop drawings in accordance with Section 01 33 00 Submittal Procedures.
- .2 Product data: submit manufacturer's printed product literature, specifications and datasheets.

**PART 2 PRODUCTS**

**2.1 CABLES AND REELS**

- .1 Provide cables on reels or coils.
  - .1 Mark or tag each cable and outside of each reel or coil, to indicate cable length, voltage rating, conductor size, and manufacturer's lot number and reel number.
- .2 Each coil or reel of cable to contain only one continuous cable without splices.
- .3 Identify cables for exclusively dc applications.
- .4 Reel and mark shielded cables rated 2,001 volts and above.

**2.2 CONDUITS**

- .1 Rigid metal conduit: to CSA C22.2 No. 45, galvanized steel threaded.
- .2 Epoxy coated conduit: to CSA C22.2 No. 45, with zinc coating and corrosion resistant epoxy finish inside and outside.
- .3 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.
- .4 Rigid PVC conduit: to CSA C22.2 No. 211.2.

**2.3 CONDUIT FASTENINGS**

- .1 One hole steel straps to secure surface conduits 50 mm and smaller.
  - .1 Two hole steel straps for conduits larger than 50 mm.
- .2 Beam clamps to secure conduits to exposed steel work.
- .3 Channel type supports for two or more conduits at 2 m on centre.

- .4 Threaded rods, 6 mm diameter, to support suspended channels.

## 2.4 CONDUIT FITTINGS

- .1 Fittings: to CAN/CSA C22.2 No. 18 manufactured for use with conduit specified. Coating: same as conduit.
- .2 Ensure factory "ells" where 90 degrees bends for 25 mm and larger conduits.
- .3 Watertight connectors and couplings for EMT.
  - .1 Set-screws are not acceptable.

## 2.5 FISH CORD

- .1 Polypropylene.

## PART 3 EXECUTION

### 3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

### 3.2 INSTALLATION

- .1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
- .2 Conceal conduits except in mechanical and electrical service rooms.
- .3 Surface mount conduits except where specified otherwise.
- .4 Use rigid galvanized steel threaded conduit outdoors except where specified otherwise.
- .5 Use epoxy coated conduit in corrosive areas.
- .6 Use electrical metallic tubing (EMT) indoors, except where specified otherwise.
- .7 Use explosion proof flexible connection for connection to explosion proof devices.
- .8 Install conduit sealing fittings in hazardous areas.
  - .1 Fill with compound.
- .9 Minimum conduit size: 21 mm.
- .10 Bend conduit cold:
  - .1 Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .11 Mechanically bend steel conduit over 27 mm diameter.
- .12 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.
- .13 Install fish cord in empty conduits.

- .14 Remove and replace blocked conduit sections.
  - .1 Do not use liquids to clean out conduits.
- .15 Dry conduits out before installing wire.
- .16 Remove burrs and sharp edges of conduits prior to installation.

### 3.3 SURFACE CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Run conduits in flanged portion of structural steel.
- .3 Group conduits wherever possible on surface channels.
- .4 Do not pass conduits through structural members except as indicated.
- .5 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

### 3.4 CONCEALED CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Do not install horizontal runs in masonry walls.
- .3 Do not install conduits in terrazzo or concrete toppings.

### 3.5 CONDUITS UNDERGROUND

- .1 Slope conduits to provide drainage.
- .2 Waterproof joints (PVC excepted) with heavy coat of bituminous paint.

### 3.6 CLEANING

- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00 Submittal Procedures
- .2 Section 26 05 00 – Common Work Results for Electrical
- .3 Section 01 78 00 – Closeout Submittals
- .4 Section 01 61 00 - Common Product Requirements

**1.2 REFERENCES**

- .1 National Electrical Manufacturers Association (NEMA)
  - .1 NEMA ICS 1-2000(R2008), Industrial Control and Systems: General Requirements.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for control devices and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of British Columbia, Canada.
  - .2 Include schematic, wiring, interconnection diagrams.

**1.4 QUALITY ASSURANCE**

- .1 Conduct tests in accordance with Section 26 05 00 - Common Work Results for Electrical.

**1.5 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for control devices for incorporation into manual.

**1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

- .3 Storage and Handling Requirements:
  - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect control devices from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

## **PART 2 PRODUCTS**

### **2.1 E-STOP BUTTONS**

- .1 Standard, marine grade, outdoor rated and hazardous area rated mushroom type. 1-NO and 1-NC contacts rated at 120 V, AC, labels as indicated. Stop pushbuttons coloured red, labeled "emergency stop".
- .2 Provide marine, outdoor and hazardous area rated enclosures as required.

### **2.2 SWITCHES**

- .1 Hazardous area rated, 2 position switches as indicated on drawings. Standard wing lever rated at 120V AC, labels as indicated.
- .2 Provide outdoor and hazardous area rated enclosures as required.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for control devices installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Engineer.
  - .2 Inform Engineer of unacceptable conditions immediately upon discovery. Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Engineer.

### **3.2 INSTALLATION**

- .1 Install switches and E-stop pushbuttons as indicated on the Drawings.
- .2 Comply with all manufacturer's installation instructions and requirements.
- .3 Provide wiring for control devices.

### **3.3 FIELD QUALITY CONTROL**

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Depending upon magnitude and complexity, divide control system into convenient sections, energize one section at time and check out operation of section.
- .3 Upon completion of sectional test, undertake group testing.
- .4 Check out complete system for operational sequencing.



**3.4 CLEANING**

- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

**END OF SECTION**

**PART 1 GENERAL**

**1.1 GENERAL INSTRUCTIONS**

- .1 The General Instructions shall form part of this Section.
- .2 All works and materials shall meet the requirements of the standards referenced herein, the General Instructions, and specific requirements outlined in the following sub-sections.
- .3 Shop drawings of tanks available from Departmental Representative.

**PART 2 PRODUCTS**

**2.1 MAIN ABOVEGROUND STORAGE TANK**

- .1 Supplied by Owner refer to Drawings M102 and M104.
- .2 5-2200 litre steel, double wall - Gasoline.
- .3 Extreme care shall be taken during loading and offloading, moving, and positioning of the tanks to ensure that no damage occurs. Where paint is scratched it shall be touched up to match the original coating with paint supplied by the Manufacturer.
- .4 Two existing Fuel Pump Cabinets with pumps, meters and filters.

**PART 3 EXECUTION**

**3.1 TANK MANUFACTURING AND INSTALLATION SPECIFICATIONS**

- .1 Four 2200 litre tanks are supplied by the Owner and are located at the Huxley Island site, the contractor is responsible for the relocation and the installation.
- .2 One 2200 litre tank is supplied by the Owner and is located on the Parks Float anchored approximately 150 meters off shore at the Ellen Island site. The Contractor is responsible for transport from the float to the Ellen Island site and the installation.

**3.2 CONDITION OF SERVICE**

- .1 For Gasoline Fuel.
- .2 Environment is coastal weather conditions.
- .3 Seismically active area.

**3.3 TANK INSTALLATION**

- .1 All tanks shall be visually inspected over the entire surface. Special attention should be given to locations of shipping cradles and attachment straps. If any damage is present the tank shall not be installed until inspected and repaired if necessary by the manufacturer's representative.
- .2 Inspect for the following defects:
- .3 Visible damage to shell plate or nozzles; i.e. dents, appurtenance nozzles out of alignment, stress bends or deformation of shell plates and/or saddle supports and paint scrapes.
- .4 The Contractor shall immediately report all other defects to the Departmental Representative. The report of damage to the Departmental Representative shall include photographs signed and dated by the Contractor's on-site foreman.
- .5 Touch up all paint scrapes with paint kit supplied by tank manufacturer.

**END OF SECTION**